

# **CONSOLE DISPLAY FOR PERSONAL COMPUTERS**

## **BACKGROUND OF THE INVENTION**

### **1. Field of the Invention**

The present invention relates to a console display for personal computers, especially to a display device installable on a personal computer to track the operation conditions of critical components by displaying related operation data through a display window on the face panel of the computer.

### **2. Description of Related Arts**

To cope with increased sophistication in our daily life, more and more people have to rely on personal computers to support their regular business functions. A personal computer is generally constructed with an input unit, a main processing unit, and a display unit. However, for novice users with no adequate knowledge of the operating principles and the hardware, computers are not that friendly at all, and have been known to exasperate many users.

Analyzing the common hardware problems, failure of the cooling fans or overheating of the central processors (CPU) are among the most frequently encountered by computer users. The operating conditions of these hardware components cannot be easily monitored when the computer is in operation because these components are usually installed inside the casing. In fact, it is almost impossible, even for an experienced user with a technical background, to predict any hardware problems before the component actually fails. For a computerized operation system, such a failure could be quite costly, in terms of the potential data lost, the system down time, and the hardware replacement costs.

1           One of the ways to prevent the above-mentioned hardware failures is to  
2   install a console display on the face panel of the computer, such that the computer  
3   user can track the operation conditions of critical components through a display  
4   window on a continuous basis, and detect any early signs of any developing  
5   hardware problems and take precautionary actions for emergencies in advance of  
6   actual hardware failures.

#### 7   SUMMARY OF THE INVENTION

8           The main object of the present invention is to provide a console display  
9   for personal computers, which is installable on a personal computer to provide  
10   users with continuous information with regard to the operation status of critical  
11   components in the computer, such that the user can identify early signs of any  
12   developing hardware problems, and take precautionary actions for emergencies  
13   or shut down the system for a maintenance check.

14          To this end, the present invention makes use of a display console  
15   installable on the face panel of the host computer, with a signal detection circuit  
16   and a dial meter, to track the operation data values of critical components in the  
17   host computer, wherein the signal detection circuit is connected to a specific  
18   hardware component in the host computer for retrieving operation data, and the  
19   operation data values are displayed through a dial meter installed on the face  
20   panel of the host computer.

21          The specific hardware component in the host computer connectable to  
22   the console display, in accordance with the present invention, can be a cooling  
23   fan. In this case, the signal detection circuit becomes a revolution count circuit  
24   connected in between the cooling fan and the dial meter, to check the revolution

1 per minute (rpm) of the fan and output the operation data values to the dial meter,  
2 such that the computer user is able to track the operation status of the cooling fan.

3         The specific hardware component in the host computer connectable to  
4 the console display, in accordance with the present invention, can also be a sound  
5 controller or a sound card. In that case the signal detection circuit is an output  
6 amplitude signal detection circuit connected to the line output of the sound  
7 controller or sound card to check the magnitude of the output signal and then  
8 output a drive signal to the dial meter for displaying the magnitude of the output  
9 signal, such that the computer user is able to track the operation status of the  
10 sound controller or sound card.

11         The specific hardware component in the host computer connectable to  
12 the console display, in accordance with the present invention, can also be a  
13 central processor. In that case, the signal detection circuit is connected to a  
14 temperature detection circuit located in close proximity to the central processor.  
15 The operating temperature of the central processor will be continuously recorded  
16 by the temperature detection circuit and output to the dial meter for displaying  
17 the temperature values to the computer user, such that the computer user is able  
18 to track the operating temperature and the operation status of the central  
19 processor.

20         Through the console display, the computer user can be aware of the  
21 operation statuses of critical hardware components in the host computer. The  
22 selection of target components is based on an analysis of the probability of failure  
23 for critical components in the host computer. The continuous tracking of the  
24 operation of critical components allows the computer user to avoid any abnormal

1 situations that could lead to hardware failures and so take precautionary actions  
2 in advance. The console display installable on the face panel of a personal  
3 computer not only provides the practical functions as mentioned above, but also  
4 adds to the decorative effect on the face panel of the computer.

5 The features and structure of the present invention will be more clearly  
6 understood when taken in conjunction with the accompanying figures.

#### 7 BRIEF DESCRIPTION OF THE DRAWINGS

8 Fig. 1 is an exploded view of the present invention;

9 Fig. 2 is a rear view of the present invention from the back of the face  
10 panel;

11 Fig. 3 is a schematic of the revolution count circuit;

12 Figs. 4A-4B are a schematic of the audio signal detection circuit;

13 Fig. 5 is a schematic of the temperature detection circuit; and

14 Fig. 6 is an example of the present installation in a personal computer.

#### 15 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

16 The present invention provides a console display installable on the face  
17 panel of a personal computer to track the operation status of specific hardware  
18 components inside the host computer by displaying the metered operation data  
19 values through a display window.

20 The structure of the present invention is shown in Figs. 1 and 2. The  
21 console display is a display device (20) installable on the back side of a face  
22 panel (10) in a host computer making connection with specific hardware  
23 components in the host computer. There is a display window (11) on the face  
24 panel (10) of the host computer for displaying the metered operation data values

1           The display device (20) comprises:  
2           a signal detection circuit (not shown in the diagrams) being set up on a  
3           circuit board (21) with an L point connected to a specific hardware component to  
4           retrieve the operation status of the hardware component;  
5           a dial indicator (22) being connected to the output of the signal detection  
6           circuit to display the metered operation data values through a display window (11)  
7           on the face panel (10) reflecting the operation status of a specific hardware  
8           component; and  
9           a power circuit (23) being installed on a circuit board (21), which  
10          converts the input power to an appropriate voltage to supply the operation  
11          requirements of the signal detection circuit and the dial indicator (22). The power  
12          circuit, as shown in Fig. 3, includes a voltage divider with R1/R2 structure, to  
13          provide operating voltages (V1, V2) to the signal detection circuit and the dial  
14          indicator (22).

15          The circuit diagram of the display device shown in Fig. 3 is used to track  
16          the rpm of the cooling fan, wherein the related signal detection circuit is a  
17          revolution counting circuit (30) formed by a variable voltage regulator (31). The  
18          reference voltage pin 3 of the variable voltage regulator (31) is grounded through  
19          a variable resistor VR301, used for changing voltage values. The input pin 1 of  
20          the variable voltage regulator (31) is connected to the output of the power circuit  
21          V1. The output pin 2 of the variable voltage regulator (31) is respectively  
22          connected to the power input and the input of the dial indicator (22) to track the  
23          variations in output voltage of the cooling fan, so as to determine the rpm of the  
24          cooling fan and output the metered operation data values to the dial indicator (22),

1 reflecting the continuous operating status of the cooling fan.

2           The circuit diagram of the display device as shown in Figs. 4A-4B is  
3 used for tracking the output amplitude of a sound controller or sound card,  
4 wherein the related signal detection circuit is formed by an audio signal detection  
5 circuit (40) with a signal processor U1, which is connected in between the line  
6 out of the sound controller or the sound card and the dial indicator (22). The  
7 signal processor U1 is able to check the amplitude of the output audio signal to  
8 determine the magnitude of the output sound, and output the metered operation  
9 value to the dial indicator (22), reflecting the continuous operating status of the  
10 sound controller or sound card.

11           The circuit diagram of the display device shown in Fig. 5 is used for  
12 tracking the operating temperature on the surface of the central processor. The  
13 related signal detection circuit is a temperature detection circuit (50), including:  
14           a temperature detector (51) to detect variations in the surface  
15 temperature of the central processor and output a drive signal to the dial indicator  
16 (22), wherein the temperature detector (51) can be installed at a location in close  
17 proximity to the central processor; and

18           a voltage regulator (52) to provide operating voltage to the temperature  
19 detection circuit (50), wherein the voltage regulator (52) is connected in between  
20 the power circuit (23) and the temperature detector (51), formed by a resistor  
21 R202, a variable resistor VR201, and a Zener diode ZD1.

22           In accordance with the present invention, the output of the above  
23 mentioned voltage regulator (52) is grounded through a resistor R201 and  
24 connected to the dial indicator (22), to detect the variations in voltage and output

1 drive signals to the dial indicator (22), reflecting the continuous operating  
2 temperature recorded by the temperature detector (51).

3 From the foregoing, the present invention can be implemented with  
4 several types of signal detection circuits as mentioned above to check the  
5 operation status of specific hardware components inside the host computer, and  
6 the metered operation data values can be displayed to the computer user on a  
7 continuous basis through a display window on the face panel of the host  
8 computer, as shown in Fig. 6, such that the computer user is able to monitor the  
9 operating status of critical components and identify early signs of any developing  
10 hardware problems. For users possessing a hardware background, this  
11 information can be useful for taking precautionary actions for emergencies or  
12 shutting down the computer for a maintenance check. For users without a  
13 hardware background, this information offers a learning experience in working  
14 with the personal computer. Furthermore, the addition of a display window on  
15 the face panel of the personal computer not only provides the practical values  
16 mentioned above but also adds to the decorative effect on the face panel of the  
17 personal computer.

18 The foregoing description of the preferred embodiments of the present  
19 invention is intended to be illustrative only and, under no circumstances, should  
20 the scope of the present invention be so restricted.